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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Lennart Stridsberg

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EXAMINER

ELKASSABGI, HEBA

ART UNIT

PAPER NUMBER

2834

DATE MAILED: 06/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 09/889,784	Applicant(s) STRIDSBERG, LENNART	
	Examiner Heba Elkassabgi	Art Unit 2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 March 2004.  
 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 26-122 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☒ Claim(s) 56-76, 84-87, 115-122 is/are allowed.  
 6) ☒ Claim(s) 26-55, 77-81, 88-90, 93-95, 103, 104 and 109-112 is/are rejected.  
 7) ☒ Claim(s) 82, 83, 91, 92, 96-102, 105-108, 113 and 114 is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) ☐ All b) ☐ Some \* c) ☐ None of:  
 1. ☐ Certified copies of the priority documents have been received.  
 2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
 \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

- A. Claims 26-55 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention. The claim limitation of "wherein the angle, taken from the axis, between any two of said at least three pole teeth is substantially an integer multiple of the angular pitch of the magnet poles of the at least one permanent magnet of the rotor." The applicant does not disclose in the specification of the application that the pole teeth are substantially an integer multiple of the angular pitch of the magnet poles, the specification discloses specific numerical pitches and that the term substantially is further defined that the pole teeth does not have to be an integer of a multiple of the angular pitch of the magnet poles.

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

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A. Claims 96 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim limitation of " at least three pole teeth and /or at least one permanent magnet are /is arranged that by activating the at lest one winding the rotor can move with a peak to peak movement only within a limited angular range about the axis." The language of "at least three pole teeth and or at least one permanent magnet are arranged by activating is vague as to if the applicants is claiming that the permanent magnet of the rotor or the pole teeth of the stator is activated by the winding of the stator, because the rotor is not claimed to having windings, which is not clearly stated in the specification as to how the arrangemnt of the stator teeth and or the permant magnet of the rotro results to the peak to peak movement. The examiner respectfully requests the applicant to better define the claim language and the speciifcation.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

A. Claims 77-81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spiesberger (US Patent 4031419) and further in view of Sakamoto (US Patent 6741006).

Spiesberger et al. discloses in figures 1-5 an electromagnetic rotary actuator controlled by a single voltage and having rotor (20) movable about an axis and permanent magnets (20N, 20S) having magnet poles. A stator (21) having at least one winding and an air gap between and facing the surfaces of the permanent magnets (20) and arranged to have flux lines extending in the air gap substantially a radial direction from or towards the axis. The stator (21) having five pole teeth (2-7) made of magnetically permeable material, particular a soft-iron material, with at least one winding applied around the center of the pole teeth (3-6) having end surfaces forming the facing surfaces the stator (21) and facing surfaces of at least one permanent magnet (20N, 20S) over the air gap; and the pole teeth are arranged within angle smaller than 225 degrees (claim 78) at more than a full turn. In regards to claim 79, the magnet poles of at least one permanent magnet of the rotor (20) and the poles (2-7) have the same angular pitch. In regards to claim 80, the pole teeth (2-7) is arranged to activate at least one winding and a rotor can move with a peak to peak movement at a n angular range. In regards to claim 81, at least one winding is applied around the central portion of the pole teeth (2-7) as individual coil and that each coil winding is connected to receive the same electrical phase. However, Spiesberger et al. does not disclose that the stator poles are exactly five poles.

Sakamoto discloses (see abstract) that the stator with coil windings (51-1 to 51-4) located at a central portion of the pole teeth (52-1 to 52-12) having any number of desired pole teeth in which the poles are separated by 180 degrees from one another. The desired number of stator poles is chosen in order to enhance the magnetic valance.

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It would have been obvious to one of ordinary skill in the art to combine the motor structure of Spiesberger et al. with the desired number of stator poles of Sakamoto in order to enhance the magnetic valance.

B. Claims 88-90,93-95,103-104, 109-112 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spiesberger et al. (US Patent 4031419) and further in view of Horst et al. (US Patent 6717314).

Spiesberger et al. discloses in figures 1-5 an electromagnetic rotary actuator controlled by a single voltage and having rotor (20) movable about an axis and permanent magnets (20N, 20S) having magnet poles. A stator (21) having at least one winding and an air gap between and facing the surfaces of the permanent magnets (20) and arranged to have flux lines extending in the air gap substantially a radial direction from or towards the axis. The stator (21) having at least three pole teeth (2-7) made of magnetically permeable material, particular a soft-iron material, with at least one winding applied around the center of the pole teeth (3-6) having end surfaces forming the facing surfaces the stator (21) and facing surfaces of at least one permanent magnet (20N, 20S) over the air gap. In regards to claim 95, magnet poles of at least the permanent magnet rotor and t least three pole teeth all have the same angular pitch. In regards to claims 103-104, of a normally cylindrical surface angular sector of a part of at least one of at least three pole teeth or at least two of three pole teeth facing the magnet poles of at least one permanent magnet over the air gap has a shape adapted to reduce the cogging torque of the electromagnetic rotary actuator. In regards to claim 109, at

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least three pole teeth (1-8) include only one-wound pole teeth (any of 2-7) and only two unwound pole teeth (1 and 8). In regards to claim 111, at least three pole teeth (any combination of 2-7) having three wound pole teeth and only two unwound pole teeth (1 and 8). However, Spiesberger et al. does not disclose that each coil winding is connected to receive the same electrical phase.

Horst et al. discloses in figures 2a-2c a permanent magnet motor (1) having a stator (2) a rotor (3), in which the stator has at least three stator poles (4) with coils (22,24) wound around the central portion of the stator pole and that each coil winding (22,24) is connected by the end terminals (claim 89) and connected in a series (claim 90) in which the coils are energized they are energized in the same phase. In regards to claim 93 and 94, at least three poles (4) are connected to a single voltage source with the windings centrally located. In regards to claim 110, at least three pole teeth having three pole teeth that are wound and no unwound pole teeth. In regards to claim 112, at least three pole teeth having five pole teeth that are wound and no unwound pole teeth.

It would have been obvious to one having ordinary skill in the art to combine the structure of Spiesberger et al. with the stator structure of Horst et al. in order to provide high torque output and low cogging torque.

#### ***Allowable Subject Matter***

1. Claim 82 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the

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base claim and any intervening claims. The prior art does not disclose a rotor having at least one permanent magnet having exactly four magnet poles along its periphery.

2. Claim 83 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not disclose a stator having exactly five pole teeth that include three pole teeth having coils wound around them and two pole teeth with not coil.

3. Claim 91 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Prior art does not disclose at least three pole teeth are located close to the facing surfaces of at least one permanent magnet creating an air gap smaller than 0.5mm.

4. Claim 92 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Prior art does not disclose at least three pole teeth are located close to the facing surfaces of at least one permanent magnet creating an air gap smaller than 0.3mm.



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5. Claim 96-102 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Prior art does not disclose at least three pole teeth arranged by activating at least one winding of the stator pole to move the rotor with a peak-to-peak movement within a limited angular range about an axis.

6. Claims 105 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not disclose at least three pole teeth that have at least one winding at a reduced height in the axial direction at places of the pole tooth in which at least one winding is located at a portion of the pole tooth located at an air gap and at a radially inner surface of the pole tooth to be longer in an axial direction than a portion of a pole tooth located axially inside the at least one winding applied to the pole tooth.

7. Claims 106 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not disclose an electronic driver circuit including a resistance changer to increase a resistance connected in a series with at least one winding when a longer electric time constant is advantageous to reduce the resistance in a series with at least one winding when a short electric time constant is advantageous.

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8. Claims 107 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not disclose at least one permanent magnet having a number of magnet poles along its periphery that is one less than the number of pole teeth.

9. Claim 108 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not disclose a stator having at least three poles with an angle between adjacent magnet poles of at least one permanent magnet being larger than the maximum of the displacement of the rotor from a center position of the rotor.

10. Claims 113-114 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not disclose a stator having at least three pole teeth having web portions projecting towards the rotor, the web portions having there ends facing the rotor triangular peripheral projections, the free edges of the triangular peripheral projections located close to each other for adjacent ones of the at least three pole teeth.

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11. Claims 56-69 are allowed over the prior art as previously indicated in non-final office action of 09/24/2003, the prior art does not disclose end surfaces of the pole teeth are located close to the facing surfaces of the at least one permanent magnet creating an air gap smaller than 0.3m.

12. Claims 70-76 are allowed over the prior art as previously indicated in non-final office action of 09/24/2003, the prior art does not disclose at least one permanent magnet is arranged to have flux lines extending in the air gap substantially in a radial direction from or towards the axis with the stator having exactly three pole teeth and arranged within an angle and taken from the axis of at more then a third full turn.

13. Claims 84-87 are allowed over the prior art as previously indicated in non-final office action of 09/24/2003, the prior art does not discloses a stator having a substantial opening in a circumferential plane such that a portion of the rotor is exposed in a circumferential plane as illustrated in figure #2.

14. Claims 115-118 are allowed over the prior art which does not disclose at least three pole teeth and a magnet poles of at least one permanent magnet arranged when the rotor is in a position that the center one of the magnet pole faces the center of a gap between two adjacent ones of at least three pole teeth and that center of at least one of the two adjacent magnet poles faces the center of the gap between two adjacent ones of at least three pole teeth.

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15. Claims 119-122 are allowed over the prior art as previously indicated in non-final office action of 09/24/2003, the prior art does not disclose a resistance changer that increase a resistance in series with the winding or windings when a longer electric time constant is advantageous or required and to reduce the resistance in series with the winding or windings when a shorter electric time constant is advantageous or required.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-122 have been considered but are moot in view of the new grounds of rejection. The Examiner would like to extend an invitation for the applicant to review the claim language of claims 26-122 for proper grammar.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within


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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Heba Elkassabgi whose telephone number is (571) 272-2023. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on (571) 272-2044. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Heba Elkassabgi

  
BURTON S. MULLINS  
PRIMARY EXAMINER